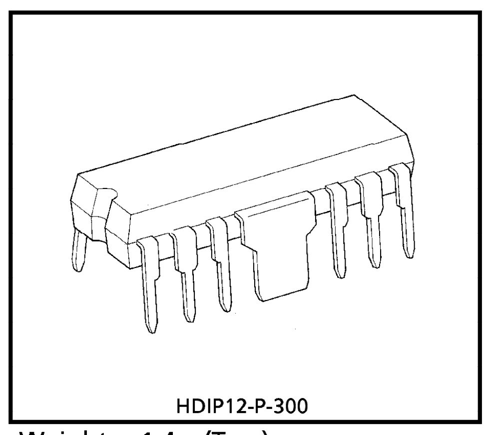
TA8217P

SILICON MONOLITHIC

DUAL AUDIO POWER AMPLIFIER

TA8217P is dual audio power amplifier designed for the audio power amplifier of portable radio cassette tape recorder.

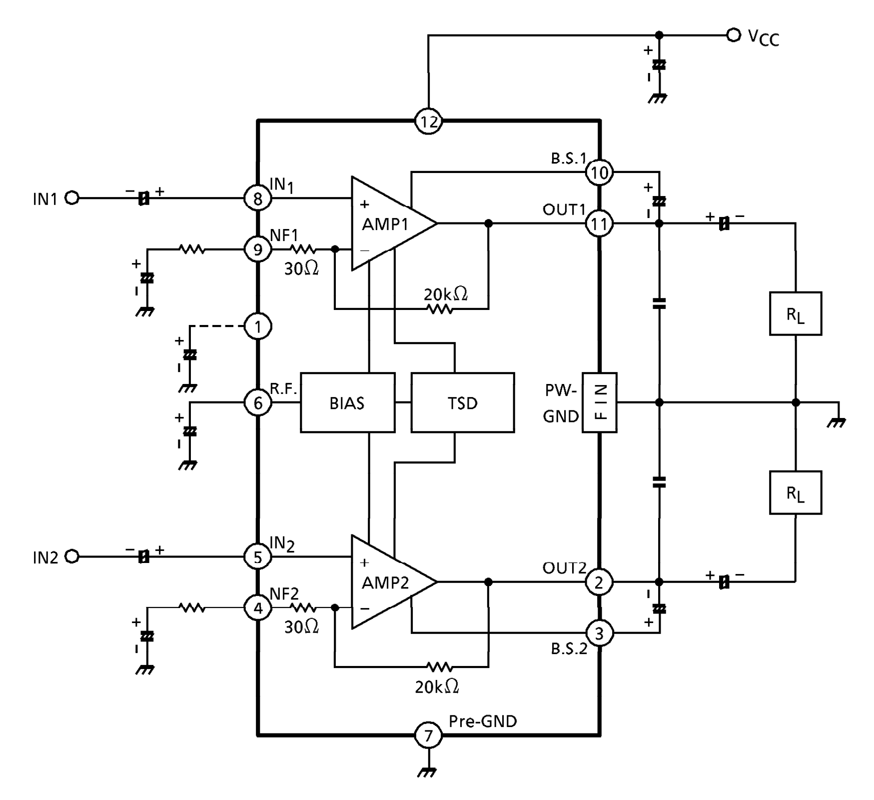


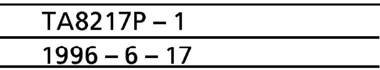
Weight : 1.4g (Typ.)

FEATURES

- High Output Power : $P_{out} = 2.5W$ (Typ.)
  ($V_{CC} = 9V$, $R_L = 4\Omega$, f = 1kHz, THD = 10%)
- Soft Clip
- Built-in Thermal Shutdown Protection Circuit
- Wide Operating Supply Voltage Range
  : $V_{CC} = 4.5\sim12V$ (Ta = 25°C)

BLOCK DIAGRAM





PRECAUTIONS FOR USE AND APPLICATION

(1) Input stage

The input stage of power amplifier is comprised of a PNP differential pair preceded by a PNP emitter follower which allows DC referencing of the source signal to ground. This eliminates the need for an input coupling capacitor. However, in case the brush noise of volume becomes a problem, provide serially a coupling capacitor to the input side.

(2) Adjustment of voltage gain

The voltage gain is fixed at $G_V \fallingdotseq 56.5dB$ by the resistors (R_1 and R_2) in IC, however, its reduction is possible through adding R_f as shown in Fig.1. In this case, the voltage gain is obtained by the following equation.

$$G_V \fallingdotseq 20\ell og \frac{R_1 + R_2 + R_f}{R_1 + R_f}$$

Fig.1

It is recommended to use this IC with the voltage gain of $G_V = 40dB$ or over.

(3) Measures against oscillation

For the capacitors C_6 and C_7 to be applied for preventing the oscillation between output terminal and GND, use the polyester film capacitor having superior quality in high frequency and temperature characteristics, however, since the characteristics of the capacitor may be different depending on the manufactures or kinds, apply the capacitor after confirmation.
Since the characteristics of the capacitor of the ceramic Type are liable to be affected by the temperature and the voltage, use the capacitor of larger capacity and be sure to perform the thermal test to check the oscillation allowance.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	20	V
Power Dissipation (Package Limitation)	P_D (Note 1)	4.0	W
Output Current	I_O	2.5	A
Operating Temperature	T_{opr}	−20~75	°C
Storage Temperature	T_{stg}	−55~150	°C

(Note 1) Value for mounting on PC board (Refer to P_D − Ta curve)

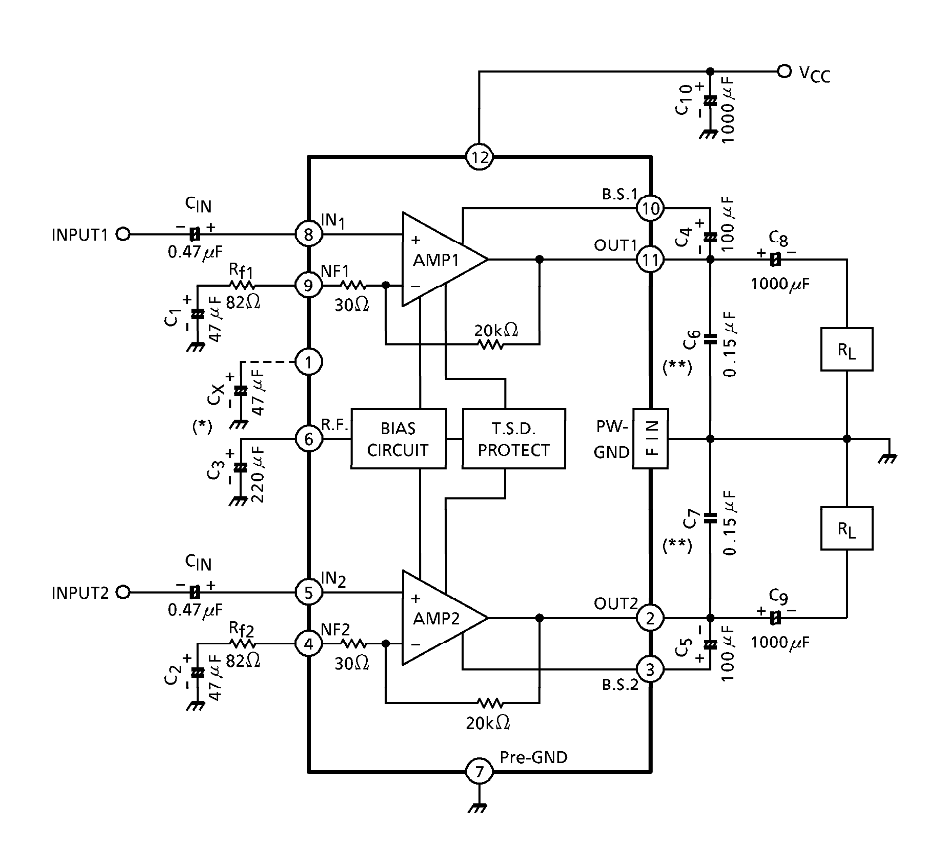
ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, V_{CC} = 9V, R_L = 4Ω, R_g = 600Ω, f = 1kHz, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	V_{in} = 0	—	23	55	mA
Output Power	$P_{out\ (1)}$	—	THD = 10%	2.0	2.5	—	W
	$P_{out\ (2)}$		THD = 10%, R_L = 3Ω	—	2.9	—	
	$P_{out\ (3)}$		THD = 10%, V_{CC} = 6V	—	1.0	—	
Total Harmonic Distortion	THD	—	P_{out} = 0.4W, G_V = 45dB	—	0.2	1.2	%
Voltage Gain	$G_{V\ (1)}$	—	R_f = 82Ω, V_{out} = 0.775V_{rms} (0dBm)	43	45	47	dB
	$G_{V\ (2)}$		R_f = 0, V_{out} = 0.775V_{rms} (0dBm)	—	56	—	
Cross Talk	C.T.	—	R_g = 600Ω, V_{out} = 0.775V_{rms} (0dBm)	—	−60	—	dB
Ripple Rejection Ratio	R.R.	—	R_g = 600Ω, V_{ripple} = 0.245V_{rms} (−10dBm) f_{ripple} = 100Hz	—	−52	−45	dB
Output Noise Voltage	V_{no}	—	R_g = 10kΩ, G_V = 45dB B_W = 20~20kHz	—	0.35	1.0	mV_{rms}
Input Resistance	R_{IN}	—	—	—	30	—	kΩ
Input Offset Voltage	V_5, V_8	—	V_{in} = 0	—	20	—	mW

TYP. DC VOLTAGE OF EACH TERMINAL (V_{CC} = 9V, Ta = 25°C by test circuit)

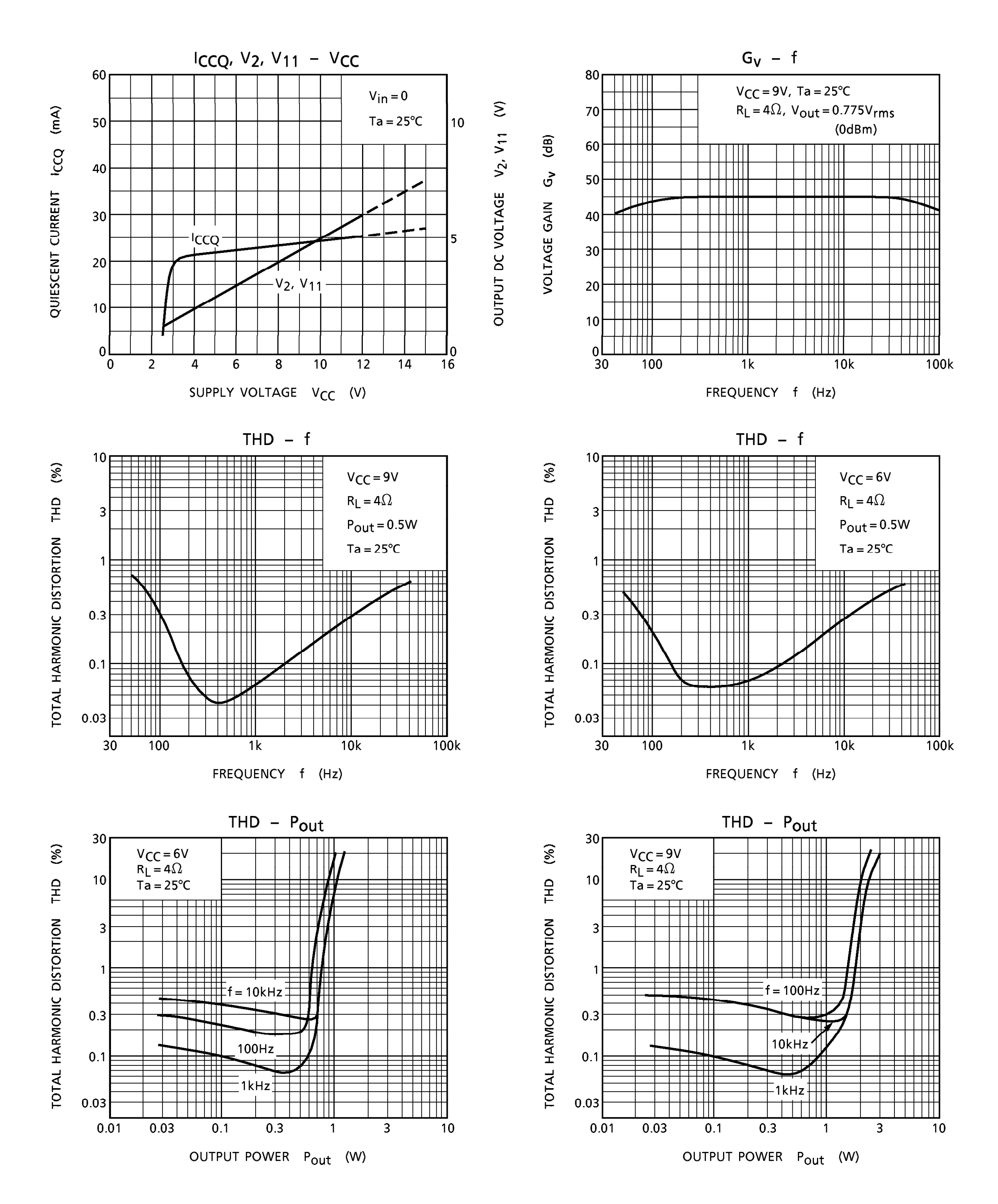
TERMINAL No.	1	2	3	4	5	6	7	8	9	10	11	12
DC Voltage (V)	8.1	4.5	8.8	0.6	0.02	8.9	0	0.02	0.6	8.8	4.5	9.0

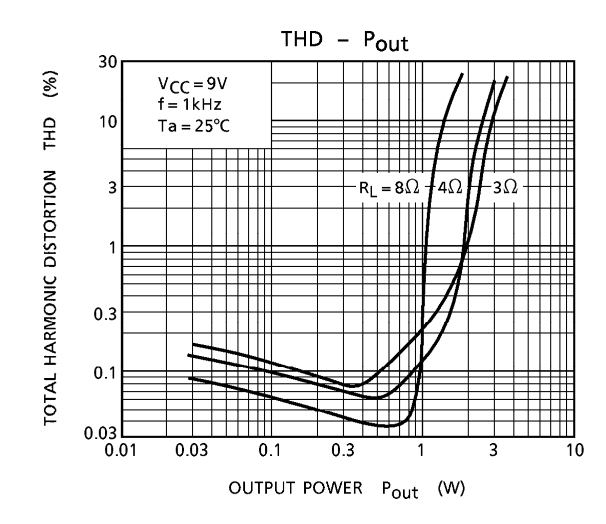
TEST CIRCUIT

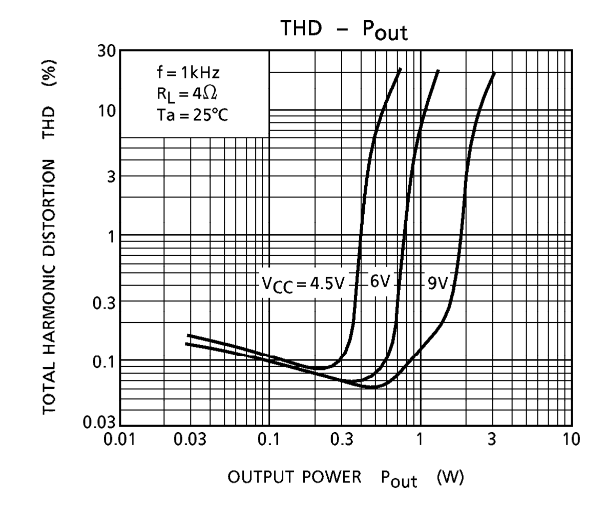


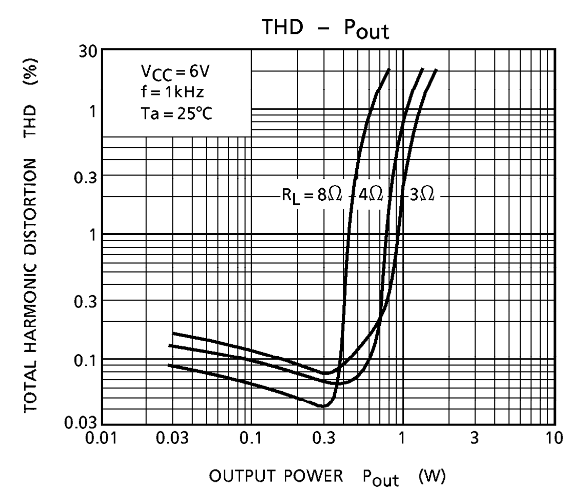
(*) C_X is a ripple filter capacitor for transition duration when supply voltage and pin① voltage are inverted.

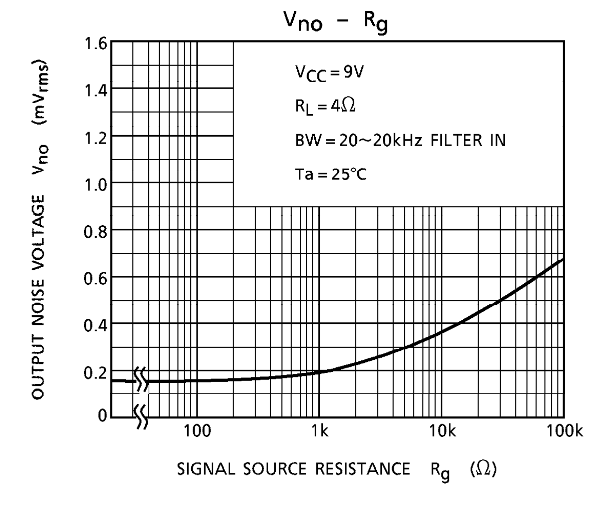
(**) For C_6 and C_7, it is advised to use polyester film capacitor having superior quality in the characteristics of high frequency and temperature.

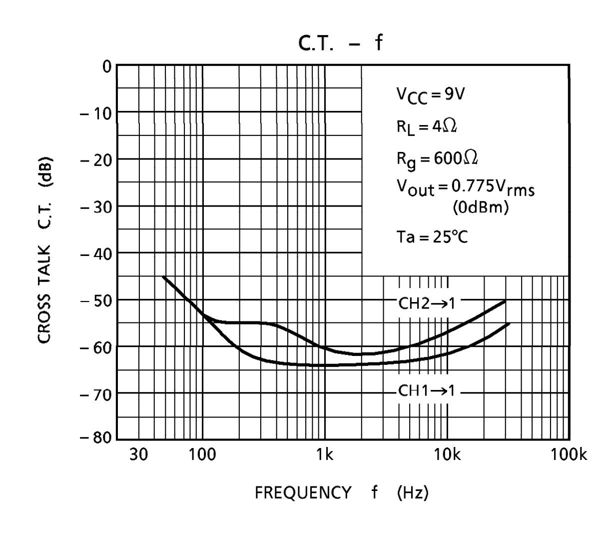

ICCQ, V2, V11 – VCC
Vin = 0
Ta = 25°C
ICCQ
V2, V11
QUIESCENT CURRENT ICCQ (mA)
OUTPUT DC VOLTAGE V2, V11 (V)
SUPPLY VOLTAGE VCC (V)
Gv – f
VCC = 9V, Ta = 25°C
RL = 4Ω, Vout = 0.775Vrms
(0dBm)
VOLTAGE GAIN Gv (dB)
FREQUENCY f (Hz)
THD – f
VCC = 9V
RL = 4Ω
Pout = 0.5W
Ta = 25°C
TOTAL HARMONIC DISTORTION THD (%)
FREQUENCY f (Hz)
THD – f
VCC = 6V
RL = 4Ω
Pout = 0.5W
Ta = 25°C
TOTAL HARMONIC DISTORTION THD (%)
FREQUENCY f (Hz)
THD – Pout
VCC = 6V
RL = 4Ω
Ta = 25°C
f = 10kHz
100Hz
1kHz
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT POWER Pout (W)
THD – Pout
VCC = 9V
RL = 4Ω
Ta = 25°C
f = 100Hz
10kHz
1kHz
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT POWER Pout (W)

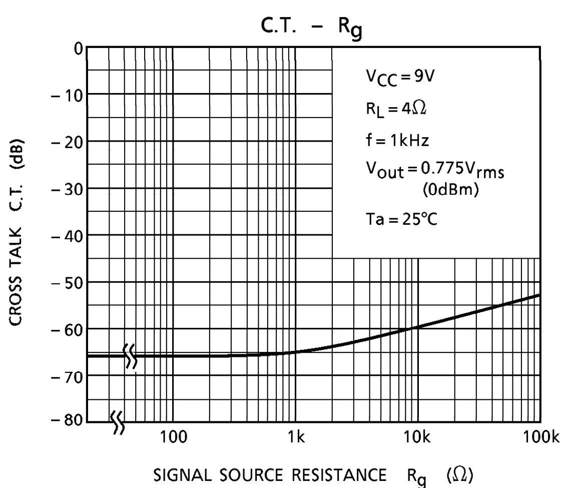

THD – Pout
VCC = 9V
f = 1kHz
Ta = 25°C
RL = 8Ω
4Ω
3Ω
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT POWER Pout (W)
30
10
3
1
0.3
0.1
0.03
0.01
0.03
0.1
0.3
1
3
10

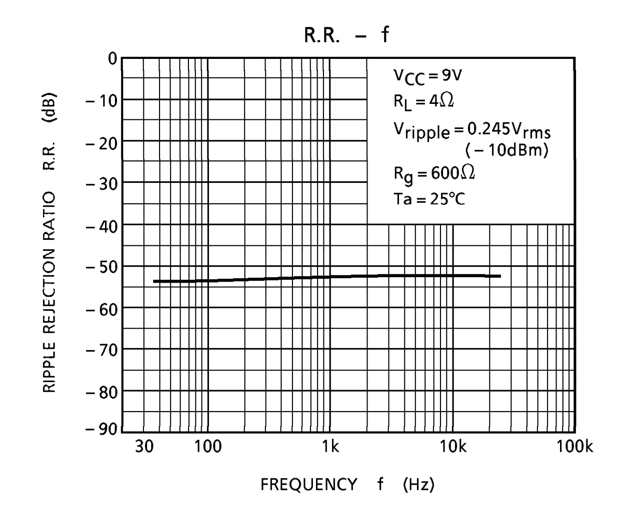

THD – Pout
f = 1kHz
RL = 4Ω
Ta = 25°C
VCC = 4.5V
6V
9V
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT POWER Pout (W)

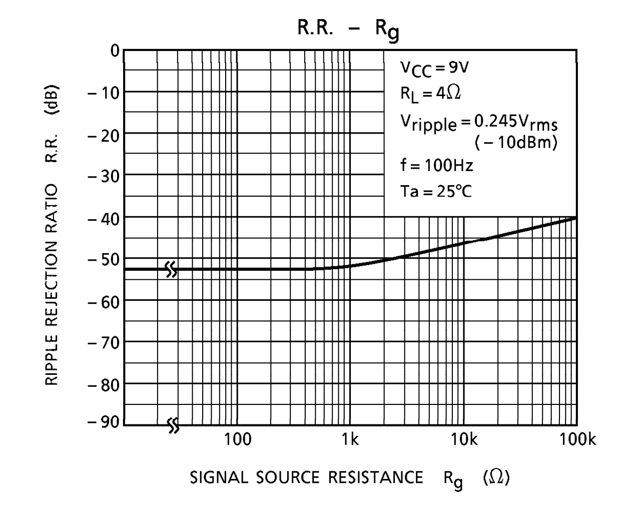

THD – Pout
VCC = 6V
f = 1kHz
Ta = 25°C
RL = 8Ω
4Ω
3Ω
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT POWER Pout (W)

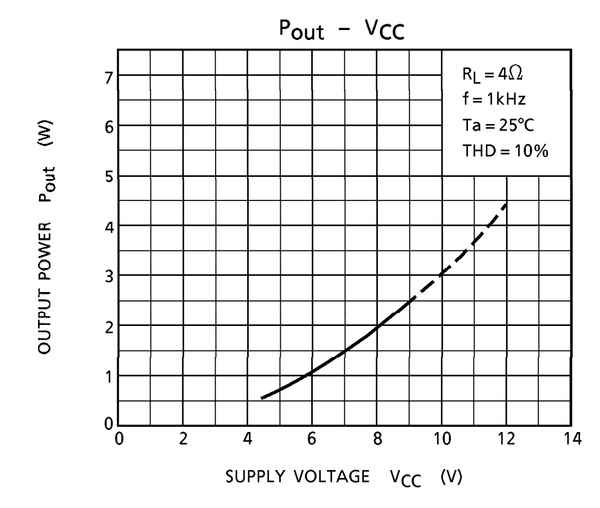

Vno – Rg
VCC = 9V
RL = 4Ω
BW = 20~20kHz FILTER IN
Ta = 25°C
OUTPUT NOISE VOLTAGE Vno (mVrms)
SIGNAL SOURCE RESISTANCE Rg (Ω)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
100
1k
10k
100k

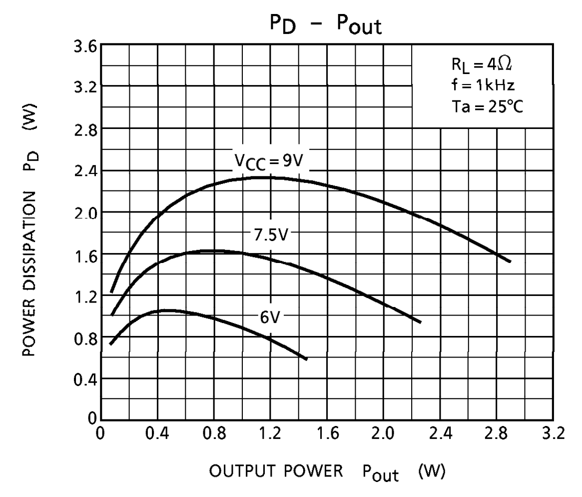

C.T. – f
VCC = 9V
RL = 4Ω
Rg = 600Ω
Vout = 0.775Vrms (0dBm)
Ta = 25°C
CH2→1
CH1→1
CROSS TALK C.T. (dB)
FREQUENCY f (Hz)
0
– 10
– 20
– 30
– 40
– 50
– 60
– 70
– 80
30
100
1k
10k
100k


C.T. – Rg
VCC = 9V
RL = 4Ω
f = 1kHz
Vout = 0.775Vrms (0dBm)
Ta = 25°C
CROSS TALK C.T. (dB)
SIGNAL SOURCE RESISTANCE Rg (Ω)

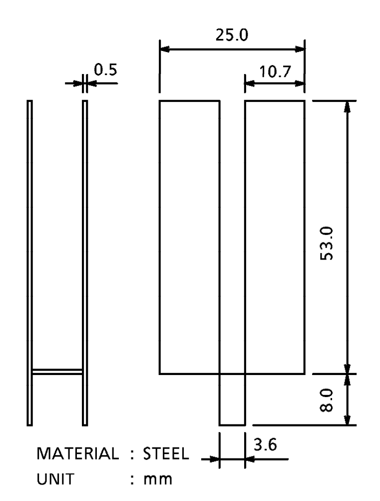

R.R. – f
RIPPLE REJECTION RATIO R.R. (dB)
0
– 10
– 20
– 30
– 40
– 50
– 60
– 70
– 80
– 90
30
100
1k
10k
100k
FREQUENCY f (Hz)
VCC = 9V
RL = 4Ω
Vripple = 0.245Vrms
(– 10dBm)
Rg = 600Ω
Ta = 25°C


R.R. – Rg
RIPPLE REJECTION RATIO R.R. (dB)
0
– 10
– 20
– 30
– 40
– 50
– 60
– 70
– 80
– 90
100
1k
10k
100k
SIGNAL SOURCE RESISTANCE Rg (Ω)
VCC = 9V
RL = 4Ω
Vripple = 0.245Vrms
(– 10dBm)
f = 100Hz
Ta = 25°C

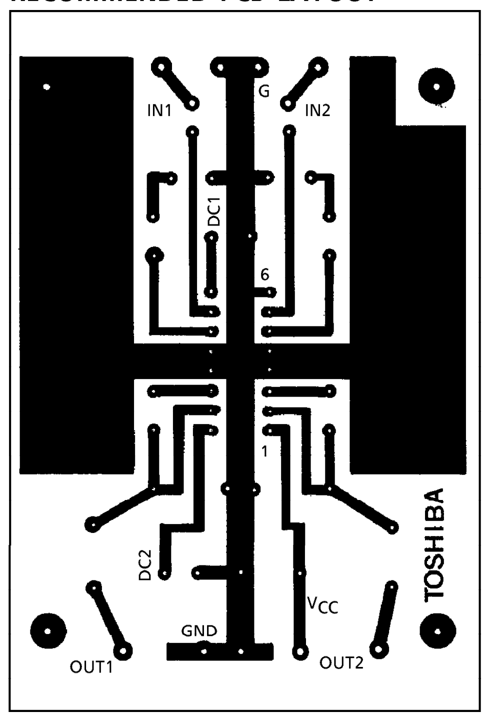

Pout – VCC
OUTPUT POWER Pout (W)
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
SUPPLY VOLTAGE VCC (V)
RL = 4Ω
f = 1kHz
Ta = 25°C
THD = 10%


PD – Pout
POWER DISSIPATION PD (W)
0
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
3.6
0
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
OUTPUT POWER Pout (W)
RL = 4Ω
f = 1kHz
Ta = 25°C
VCC = 9V
7.5V
6V

HEAT SINK



RECOMMENDED PCB LAYOUT



PCB : EPOXY GLASS
80mm × 60mm × 1.2mm

P_D – Ta

ALLOWABLE POWER DISSIPATION P_D (W)

HEAT SINK + PCB

PCB

NO HEAT SINK

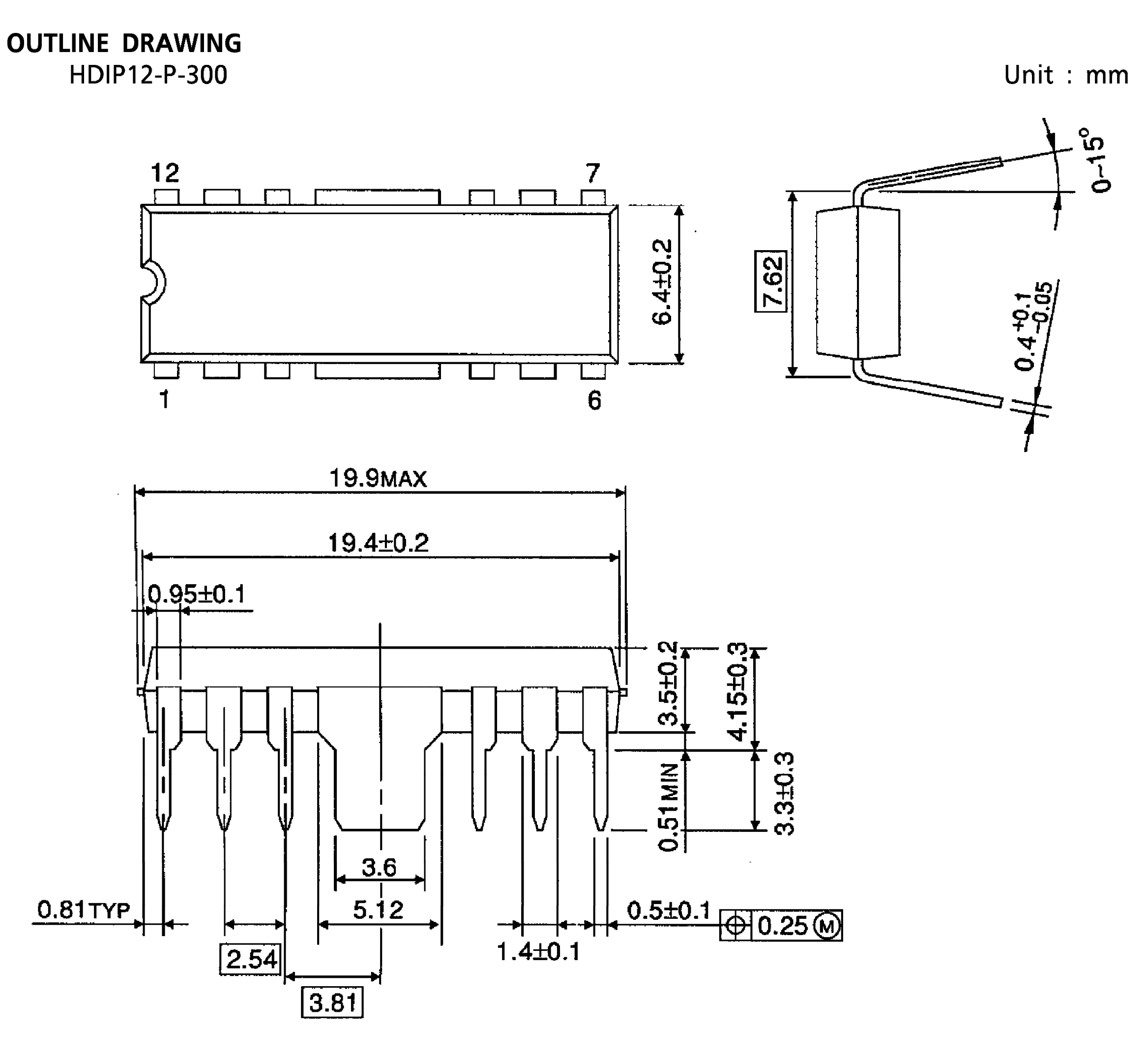
0 1 2 3 4 5 6 7

0 25 50 75 100 125 150

AMBIENT TEMPERATURE Ta (°C)

OUTLINE DRAWING
HDIP12-P-300

Unit : mm



Weight : 1.4g (Typ.)